

SHOWERHEAD ASSEMBLY AND ALD METHODS

Abstract

An apparatus for depositing thin films onto a substrate is provided. The apparatus includes a gas exchange plate that is positioned within a reaction chamber having a platform. The gas exchange plate may be positioned above or below the platform and comprises a first plurality of passages and a second plurality of passages machined therein. The first plurality of passages is in fluid communication with a first reactant source and a purge gas source. Similarly, the second plurality of passages is in fluid communication with a second reactant source and a purge gas source. The first and the second plurality of passages are fluidly connected to first and second plurality of apertures that open to the reaction chamber. Gases are removed from the reaction space through third plurality of apertures within the gas exchange plate that are in fluid communication with exhaust space. Methods of atomic layer deposition (ALD) include exhausting gas through the plane of a gas injection system, pressure fluctuation using multiple pulse precursor and purge steps, and use of booster inert gas flows.

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